

**REPRODUCTIVE BEHAVIOUR OF
CARDISOMA CARNIFEX (HERBST, 1794)
(BRACHYURA: GECARCINIDAE) AT LIZARD
ISLAND, GREAT BARRIER REEF**

The land crab, *Cardisoma carnifex*, was first found at Lizard Island by Peter Davie of the Queensland Museum in June 1987. The closest previous record was Murray Island in the Torres Strait (Türkay, 1974).

The populations studied were located in Watson's Bay and Mermaid Cove on Lizard Island (14°40'S, 145°27'E). The Watson's Bay study site included two areas of approximately 400 sq m with over 300 obviously active burrows. The Mermaid Cove site is smaller comprising 300 sq m and 200 burrows. The burrows were located on the edge of the mangroves near the high-water mark in a community of grasses dominated by the saltwater couch, *Sporobolus virginicus*.

Reproductive behaviour and periodicity were studied between October 1987 and June 1990. The female crabs spawned by migrating from their burrows to the ocean. In Watson's Bay they migrated from their burrows on the landward edge of the mangroves, over a 5 m high spinifex covered sand dune to the ocean or followed Ferrier's Creek to its mouth. The crabs entered the sea and swam a maximum of 15 m from shore to depths of 0.1–3 m. Hatching was induced when the egg laden abdomen was submerged and the female flicked her abdomen. The egg cases immediately ruptured and the zoea swam free. Each 300–400 g crab released between 300,000 and 450,000 eggs. Egg mass was related to body weight.

Evidence from captures of berried females, tracks on the beach at Watson's Bay and Mermaid Cove, and observations of spawning, indicated that spawning was highly seasonal and tied to lunar phase on Lizard Island. In October 1988 tracks from 10 crabs were observed on the beach at Watson's Bay indicating that in at least some years spawning may begin as early as October (the austral spring). No berried females or tracks were observed in November in any of the study years. Spawning migrations occurred primarily three nights before full and new moons in December 1989 and January 1990. Spawning migrations were observed on 11–13 December 1989 (approximately 30 crabs per night at Mermaid Cove; 20 crabs per night at Watson's Bay) and 8–10 January 1990 (approximately 20 crabs at Mermaid Cove; 30 crabs at Watson's Bay), both periods occurred during the three days prior to full moon. No migrating males were observed. Also tracks from 60–70 spawning crabs were observed on 12 December 1989 in Watson's Bay and from 25–30 crabs at Mermaid Beach. Tracks from approximately 50 crabs were observed on the strand line on the new moon on 29 January 1989. There was no evidence of spawning in February 1990.

An ovigerous female was captured by the burrows on December 1989. The undifferentiated yolky eggs developed into zoea and hatched in 13 days. The timing of zoea release coincided with the December spawning migration.

Vision plays an important role in the migration. Crabs that had just released eggs were captured. Some crabs eyes were

covered blocking vision; the eyes of others were left unobstructed. When released the visually impaired crabs were disorientated. Non visually impaired crabs would immediately move up the beach and seek cover. Migrating crabs would stop if a light or large shadowy object was near them.

A sample of the migrating crabs were caught and tagged by etching the carapace with a hacksaw. Although *Cardisoma guanhumi* is known to spawn several times in a season (Lutz and Austin, 1983), none of the tagged spawning females were recaptured during subsequent spawning migrations.

During the 2 3/4 year study a total of nine copulations were observed — six between October to January and two during the last week of May. Three female crabs collected in late May/early June were dissected. Two of these were post copulatory. In all three, the brown ovaries were undeveloped and weighed 0.7, 0.9 and 1.4g.

The period between copulation and spawning in *Scylla serrata* can extend up to 7 months under unfavourable conditions of temperature and nutrition (DuPlessis, unpubl. in Heasman *et al.*, 1985). It is possible that copulation in *Cardisoma carnifex* occurs 1–5 months prior to spawning.

No precopulatory observations were made. Copulation occurred intermolt near burrows of females. Copulation occurred with crabs ventrally juxtaposed by the entrance to the female's burrow. There was little motion. The female was not constrained by the male nor were there other males in the vicinity. Copulation terminated within 1–10 minutes after being spotted. The female quickly entered a burrow while the male slowly moved away.

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N.J. Quinn, B.L. Kojis, Lizard Island Research Station, P.M.B. 37, Cairns, Queensland 4871, Australia.

K. Diele, Julius-Maximilians Universität, Würzburg, Germany.

U. Meischner, Kiel University, Kiel, Germany.